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THE
OBSTETRIC FORCEPS.

AN IMPROVEMENT



THEIR CONSTRUCTION.

BY J. A. McFERRAN, M.D.,
PHYSICIAN TO THE GYNECOLOGICAL HOSPITAL.

PHILADELPHIA:

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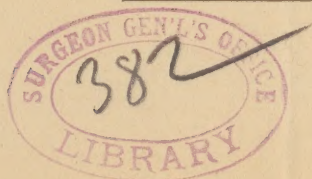
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IS THERE NOT AN ELEMENT WANTING
IN THE
CONSTRUCTION OF THE FORCEPS?

Read before the Philadelphia County Medical Society,

J. A. McFERRAN, M.D.,

PHYSICIAN TO THE GYNECOLOGICAL HOSPITAL.

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MR. PRESIDENT AND GENTLEMEN:—The question involves the whole subject of artificial delivery, and enlarges as we consider it. There has been so much said and written upon the forceps, its use, and the relative merits of it and other means as resources of art in labor, that the mere mention of the name may awaken feelings of fatigue, and call up the remembrance of an oft-told and tedious story. But the fact of so much having been written is presumptive evidence that the subject has not been exhausted, and that the medical world is not at all in harmony about the matter.

Here, in this very hall, as in like places, opinions have been opposed by opinions that had been repeated again and again, and used as arguments by masters in the profession, to convince those equally armed and argumentative on the other side. Having seen those with presumably equal skill, equal learning, and equal honesty advocating opposite doctrines, it need be no matter of surprise if here and there, among the laymen of the profession, we find those who are more befogged than enlightened by the discussion, and who have good reason to doubt the truth or superiority of either side. We are taught, at least, by these discordant exhibitions, that the shackles of authority are but cobwebs, too weak to bind any save those who are too indolent to think, or too time-serving to assert their own independence.

Why is it that experience and reason have not, since the use of the forceps was first made known, in 1733, by Chapman, marked out a certain course in an art, where, if anywhere,

mathematical certainties in medicine ought to obtain? Seeing that operative interference in labor is said to be subject to scientific mechanics, where forces become quantities, and directions multipliers or divisors. Mathematical problems are self-corrective in their solution; statements are shown to be errors or facts by the combination of numbers; and as mechanics is the arithmetic of forces and lines, here results should be as open to correction as in any other branch of mathematics. Then why is it that such diverse opinions should be held by confessedly able men? As upon these differences in opinion among obstetricians hinges what I propose to offer, I may be permitted, in the absence of one more competent, to attempt an explanation.

There is but little or no dispute about labor as a physiological act; the question arises when the intervention of art is proposed, and resolves itself into one of personal skill. The result of individual effort is offered in evidence in favor of the method used, and unfairly against the method not used. I boldly affirm that each case of difficult labor is a case by itself, and because a certain method used brought about its successful termination, that is no proof that it could not have so terminated if the procedure had been different. Nor does it prove, by any means, that it was the safest, the most rational, or the best. And, inasmuch as it is a great deal easier to tell the truth about the means used in a certain case than to give a correct account of the condition of the parts, their relative size and positions, it should count as nothing, as opposed to another case named

by the same name, but treated in a different manner.

Again, a kind of mystery attaches to a case of difficult labor, and the artificial means used to facilitate or accomplish it, partake somewhat of the nature of the occult. But like all mysteries, when stripped of the paraphernalia with which habit and credulity have enveloped it, nothing but a mere skeleton of conceived greatness, in the shape and homely form of common every-day facts, is revealed. And if but half of what is daily told of the "hair-breadth escapes" of women in travail were true, marvelous indeed was the skill that relieved or rescued them, and would be sufficient to make those less gifted shrink back in awe before such greatness, and be but too willing to hide their own littleness in the shadow following it. But let us not insult our own understandings, by reasoning upon statements of facts that were never seen in broad daylight; statements, albeit, honestly made, but gathered in the dark, by deceptive means, and of necessity removed far beyond verification or correction. A physical impossibility is as great inside of the body as out of it, and if we strip a case of labor of all sentiment, of all preconceived notions and theories, and reduce it to a question of undiluted facts, we know that an egg-shaped substance, three and a half inches in its shortest diameter, cannot pass through a hole that is only three inches across it, and that to force it through, the power used in the effort must be directed, either to enlarging the hole, or reducing the passing substance. It needs no argument to prove that no amount of skill can evade this fact, and that the only skill required is to keep the long diameter of the egg in a line with the axis of the hole, and force, applied by any hand that you please, will accomplish all that is possible. We have been told by distinguished obstetricians, that from experiments frequently made, the fact is established that the foetal head cannot be compressed more than half an inch and preserve its integrity; if so, and it is reasonable to believe it, how is it possible to believe other than that the cases of extraordinary deliveries through contracted pelves were attended by some mistakes in measurements? If so, and they were accomplished after repeated failures, it must have been the result of a correction in the line of traction, and not a sequence of any mysterious manoeuvre.

So long as the pelvis and foetal head preserve

normal relations and positions, there can be no question as to the *modus operandi* of the forces used in expelling the child. There is not, nor can there be, any mystery in natural labor. The principles that govern it are known to all. We know the measurements and configuration of a normally-formed pelvis, and it requires no labored thought or nice calculations to comprehend the easiest course for a normally formed head to take, to pass through it. About as good and as simple a conception of it as I have heard of, was given to me by a fellow student, who suggested the idea of placing myself in relatively the same position as the child. This is a simple problem, and there is no dispute about the solution, because known facts are presented, all mystery is avoided, and deception is impossible.

But all pelves are not normally-formed, nor are all heads relatively adapted to them, but oftener so than we are taught to believe. And it is not often possible to tell at the bedside the exact character or extent of the aberration. I would not be far wrong if I should say we never could. For the revelations of the dissecting room are as variable as the leaves of the forest, and are only somewhat like the deformities we meet with in the lying-in chamber. That two of these should be alike would be a mere accident, a coincidence that would not happen in the same lifetime. If it were otherwise it would be in strange contrast with abnormal growths in other parts of the body. Here, as elsewhere, deformity is only a result of a departure from healthy development; the limits to that departure are set by no certain rule, and consequently the growth has no standard in shape or size. Then who can measure it or comprehend it? Who can tell of it or describe it? I am fully aware that there have been those who have said they could. But how often have we seen the efforts of the expert prove only an experiment? An evidence of skill if successful, and an exhaustion of all the resources of art, if a failure. These stand in complete antithesis to the normally-formed pelvis. There known rules can be applied to known conditions, but here we are required to adapt certain means to uncertain and obscure malformations. To make a straight line coincide with a crooked one. To do the impossible.

Yet, in the face of all this, the attempt is made to make the result of personal experience a basis for a system which proves upon applica-

tion uncertain, and often as injurious as beneficial, if at all capable of being followed by another; and it would seem that undefined deformities would preclude any satisfactory classification of them, and deter even the best qualified from making the attempt to harmonize a thing so multifarious and inconsistent with any rule in mechanics, except that which rests upon the general principle that two things cannot occupy the same place at the same time. And we cannot account for the attempt to do so, except on the ground that human thought, like all things else, when pursuing a certain course for a long time, is apt to run in channels. Pride of opinion and consistency hedge them in; hence the advocacy of peculiar doctrines becomes a part of man's nature, and in defending them he defends himself. Pet schemes, the result of thought, what he said and what he did, become his household gods, consecrated by habit and glorified by practice. Hence men differ in the gods they worship when they make gods of themselves. They do not differ in things that they can see, touch, and handle, that they can count and measure. Nor do they differ much about things that they can reason upon from known, undisputed facts, but they will differ when an appeal is made to their faith; when a thing is but dimly revealed; when it is guessed at, not measured; and always in argument, when the premises are the questionable results of individual observation and judgment. And they differ in operative midwifery, because one obstetrician's skill has been directed in a contrary direction to his opponents; because operators magnify their office; because one case cannot be fairly compared to another, and depends upon individual judgment for even a proximate understanding of its peculiarities, which is seldom unbiased; and because the thing disputed about has never been revealed, and if seen, even obscurely, it was only by one party, and has only such an appearance as his success seemed to justify him in giving it.

Admitting, from the nature of things, that there must always remain an obscurity in cases of unnatural labor, on account of the variable extent of malformation, and the relation of parts; and that individual judgments may differ as to the shape and character of the deformity, may it not be possible, by the observance of some general principle, to harmonize the treatment, when delivery is possible?

These differences in opinion have prompted to a thorough investigation of the subject, and enlisted some of the ablest men in the profession in the search. And although they have settled but very little on a firm basis, we may gather much from what they have done that is very valuable. They may be likened unto the alchemists of old. If they have not discovered the philosopher's stone, and transmuted all they touched into gold, they have brought to light something as good as gold. They have shown non-partisans, at least, that there is some excellence in both sides of a question.

For instance, in the notable difference in opinion in relation to the relative merits of podalic version and the use of the forceps in the arrest of the head at or in the superior strait. And it merits our attention, on account of the ability of the advocates of each, who have advanced all that can be urged in defence of their respective methods. That there is merit in each admits of no further argument. But the history of obstetrics is full of evidence that statistics are as faulty here as elsewhere, one-sided in their bearing, and furnished to sustain particular views.

That there is some principle brought into play in version, not free to operate in delivery by the forceps, is manifest from the facility with which the head passes through the pelvis after turning has been completed. As urged by Professors Simpson, Goodell and others, the engaging of the bimestoid diameter of the head in the sacro-pubic diameter of the superior strait, may, and I believe does, have something to do with it; but if this were all, the advantage would be lost. Were the head fixed to a certain course by a force extrinsic to that given by the mechanical laws acting within the pelvis, as in the use of the forceps, the advantage would be of no account. In delivery by the feet, freedom of accommodation is preserved to the head, and herein lies, in my opinion, the chief advantage of podalic version as an operation of choice. And as an operation there seems but one thing wanting, and that is a safe application of power. But where the question of the strength of a child's neck is raised, and involves the question of life and death, we pause. Still, if the dangers to the child ended here, skill might evade them, or at least sink them to a level of those attendant upon other means. But necessity for haste, bringing down the arms, the pressure upon the cord, and detachment of the

placenta, compel us to say that, in spite of its seeming simplicity the chances of death for the child *are* so great, that the operation should be left in the hands of the expert. And while we acknowledge its advantages and the high standing of its advocates, we must note the fact that the world's verdict has been against it on every appeal; and although here and there we meet those who, by personal skill, have been able to give it a following, the dangers attending it in less skillful hands are so much against it, that it cannot be called a safe operation, or one that should be recommended. If we could carry the advantages of version over to the forceps, we might do much to harmonize practice; for we can use as much force with the forceps as is necessary without any direct risk to the child. But as the case now stands, it is a question in my mind, whether its successful rival is not, upon the whole, as dangerous as it, on account of the facility with which it may be used, and the ready means it offers for despatch in cases where nature would prosper better by non-interference. There has been but little improvement in the construction of the forceps since the days of Smellie and Levret. Many suggestions have been made and carried out, as to minor details, and have been adopted by different obstetricians, a part by one, and a part by another, as they happen to suit their ideas of scientific mechanics. Baudelocque said that "It is not the instrument that operates, but the hand which directs it;" and his words have passed into a professional aphorism. What he said is too true, and it is one of its greatest defects. Instrumental delivery, at best, must be considered an uncertain problem, one of blotted lines and broken curves, where propositions are suppositions, and based upon uncertain comparisons. Hence, an instrument certain in its operations, definite in its movements, and manipulated in the dark, must need great skill indeed in its handling, to avoid dangerous contacts. I know I am treading on dangerous ground; and to venture out of paths time-worn, and trod by weighty men of the profession, will subject one to difficulties which will require boldness and consideration to encounter. Education, habit of thought, and successful practice, I fear, will shut me out from a patient hearing in the declaration that it is impossible to produce traction in a proper manner, with the forceps as now constructed, and that by fixing

the head we destroy all power of accommodation, and make it a part of a lever, and that thereby we often rather impede than expedite labor.

The use of the forceps, for years, in skilled hands, has made them a fixed fact; the perfection of the instrument has not been questioned. Volumes have been written upon its use, and volumes more how to use it. And now, at this late day, to go back to the starting point, looks like a dream of wayward fancy, or a foolhardy attempt at innovation.

I admit that skill may do much, and the facile hand of the expert blind the eye of reason, by its dextrous manipulations; but when the brilliancy of the operation has somewhat faded, and the cunning of the hand is forgotten, what I now say may be at least a hint, which some one hereafter may develop into an admitted truth. But happily, in the free republic of science, it is no treason to think, the frown of authority is no longer terrible, and a profession of faith contrary to received opinions no heresy.

But in departing from the teaching of the masters in the art, I acknowledge their greatness, and it is not without misgivings that I attempt to break the thralldom of common consent to laws, so generally considered fixed, and so universally binding. And respect for their fairly-earned positions, and the honor to which learning and industry justly entitle them, demand of the dissenter something more than a simple abjuration of faith. I, therefore, beg leave to say, if in what follows I seem dictatorial, it will arise more from the nature of demonstration than arrogance. Facts in science are hard and cold, and to be effective, cannot be softened by sentiment, or tempered to suit the fashion of the times. And if what I say contravenes the dicta of my teachers, I cannot, if I would, use the argument of faith, and ask you to believe from the result of my observation, my judgment, and my skill. But shall argue from facts known, admitted, and universally operative.

The child, in passing through the pelvis, does so in a passage curved at least in two places, namely, at the angle made at the junction of the axes of the superior and inferior straits, and at the os externum. To these we might add, if Nægelé were correct, one at the angle made at the axis of the body with that of the superior strait. Having no evidence, either

from experience or reason, that this is correct, we will confine ourselves to the two.

Now, it is indisputable that, if the child were forced to this curve with no joint at the junction of the head with the spine, it would not nor could not move. A child with a stiff neck might engage in the superior strait; but it could advance no further; and one with an ankylosed spine would be as bad off. And daily observation teaches us that we have the best example of labor where the child's head is left free to seek the easiest passage for exit; where there are no anatomical aberrations or deformities, and where the propulsive force is sufficient to overcome the resistance of the soft parts and to produce the natural flexions, rotations and extensions incident to the demand made by the different curves and reversed diameters.

In the use of the forceps, the head becomes fixed against any flexion, rotation, extension or deflection, or any natural law operating to avoid or correct difficulties, and is subject to two forces, inharmonious in their nature and separate in their sources. The child's neck is practically stiff, or, at least, the head is not free to flex upon it, and the head cannot be subject to the will of the operator; it is attached to an unwieldy body in the rear, which will modify in an uncertain way all efforts made in front. Accommodation is out of the question, for the same effort cannot control both forces.

We are advised, by most distinguished teachers, to make a gentle and limited swinging, to-and-fro motion, in traction, lever-like in its character, as it is frequently expressed. I do not dispute the necessity of the manœuvre; but we know that it is not thus that the head moves when left to its own course in unassisted labors, or even in podalic version, and I am thoroughly satisfied that the leverage is greatly overestimated in the procedure; the utility of it is only necessary on account of the misdirected force, and for a purpose not contemplated, at least not spoken of, by writers upon the subject. In my opinion, it only serves to cause the head to ride over the corrugated mucous membrane shoved in advance of it, pressing unnaturally upon the parts. The head, being thrown out of line by the oblique traction, will, of necessity, be forced against the pelvis, in the direction of the operator. I know this is contrary to what is taught. Most obstetricians speak of the forceps as a double lever, with the

fulcrum at the pivoted joint, and that, by pressing first upon one handle, and then upon the other, we increase the efficiency of the force used. Upon what principle in mechanics they base their opinion I am unable to discover. If the male and female branches, when joined, do not make a unit, I do not know what unity means; they move together, and preserve their relation toward each other, direct them which way you will; and that the pivot can be a fulcrum, and change its position with the sweep of the arm of the lever, is a principle in natural philosophy that I have never learned. True, the branches are levers as compressors, and the pivot is a fulcrum to the same end; here the principle of the lever stops, and here they act independently; but when they are joined to the head, they make it a part of a common instrument; and where the head presses upon the pelvis, it may become a fulcrum, provided friction is great enough to make it stick; and the forceps, together with the head, may become a lever, on the same principle as the cant-hook. But, to be effective in this manner, the tissues of both mother and child would be subjected to a pressure greater than they would otherwise have to bear, and as it is impossible to produce such friction between smooth and lubricated surfaces ascending an inclined plane, the procedure is impracticable in obstetrical operations.

We will suppose the forceps applied to the sides of the head, in the direction of its occipitomental diameter, and suppose the head engaged in the superior strait in the first position. The forceps will fix the head at an angle of fifty degrees with the axis of the inferior strait, and the operator is expected to supply the force, give it direction, measure the progress, control the rotation and flexion, all at the same time. He is expected to avoid the perineum, keep the head to the easiest course, and use the force in the most efficient manner. And to do all this correctly, requires in the individual absolute self-control, a complete knowledge of this particular pelvis, its relation to the foetal head, the amount of force exerted by the contracting uterus, and to be possessed of an instrument perfectly adapted to all the requirements of the case. It would be too much to expect all this from human skill. Yet we all act, at times, as though we knew and could do all things necessary, and practically, in most cases, it is never discovered

that we do not; for, in spite of misdirected force, forgetfulness of curves, axes, rotations, flexions and extensions, the woman, in most cases, will be delivered and the child perchance be born.

Now, supposing, in this case, the circumstances most favorable, the relation of the head and pelvis and the yielding of the soft parts natural, is it possible with the forceps to direct the force in the direction indicated by the anatomy of the parts and the fundamental principle of mechanics? I have no hesitation in saying, no! The direction of the force should be as that given by the uterus, and that is in the direction of the axis of the superior strait. That force so directed is more efficient, meets with less obstruction, and does the least violence to the soft parts, is evident upon the least reflection, and the principle has been acknowledged all through obstetrical progress, from the days of Smellie to the present time.

The first object and effect—saying nothing of uterine dilatation—of the force is to drive the head into the cavity of the pelvis, and is exerted through the spinal column upon the base of the skull, at a point where freedom of motion is as great as in any other part of the body. The head once in the cavity, the force acts in the same manner, but gives no direction to the head, leaving it to take that which offers the least resistance. The head is held in a state of flexion in its descent by the pressure of the opposing sides of the pelvis, and is only liberated when a point near the base of the skull and the top of the pubic arch coincide. Then rotation is completed. The os coccygis is straightened, and the perineum is distended and projected forward by the force still acting in the same direction. The head is deflected from the first course by the inclined plane of the floor of the pelvis, but held by the pubic arch from extreme extension until the neck is at the arch, when flexion backward takes place, brought about, in a great measure, by the resistance of the distended perineum and os coccygis. There is but little advance of the child, as a whole, from any direct expulsive effort, after the head has reached its lowest limits in the pelvis, until after the head is delivered; and it will be observed that the direction of the force changes but very little from the time labor commences until the body is expelled, and that it is in a line with the axis of the superior

strait. The process of nature commends itself to our reason, and experience testifies to the wisdom in it. Such being the case, traction made in any other direction than that indicated by the contractions of the uterus, before descent is completed, would force the head firmer against the bones of the pelvis, destroy its freedom, and subject the opposing tissues to pressure greater than is good for either, and, without the exercise of great caution, bring about extension before the completion of the descent of the head, thereby approaching a face presentation, and subjecting the mother to the concomitant dangers.

The forceps holds and operates upon the head as a whole, and any traction out of a direct line with the axis must of necessity have a tendency to throw a longer diameter of the head across the pelvis, and out of its axis; in fact, to a greater or lesser degree, to wedge it between the opposing sides, because it is held at both ends, with a power above acting to fix it firmer and firmer, with each contraction of the womb, to its place.

The junction of the head with the body is the pivotal point in unassisted labors. But when the forceps is applied, the head is held obedient to its motions, and when traction is made out of a line coincident with the axis of the pelvis the pivot is at the point of resistance, which becomes a fulcrum, and the long arm of the lever is from the operator's hand to that point, and the head from the same point, the short arm; consequently it subjects the parts to a multiplication of the force applied, and that in a direction which impedes progress, and often too, in my opinion, to such an extent that safe delivery becomes impossible. It can hardly be possible, that if the herculean strength sometimes exerted to effect delivery were well directed, anything short of absolute and insurmountable disproportion between the parts could prevent the passage of the head through the pelvis. Picture a man of two hundred pounds weight pulling with all the blind effort of baffled skill, with his knees or feet propped against some unyielding substance, and the woman held in position by assistants; you will have no fancy picture, but a copy from reality, if the reports from operators be true. The wonder is in the fact that the tender tissues of the child do not yield and tear into fragments, and the firmer parts of the mother break into a disorganized mass under the pressure. That

women often pass through and survive this terrible ordeal, though bruised, sore, and exposed to all the dangers attendant upon the most mischievous traumatic causes, is no secret in every community; statistics, large, detailed, and convincing, could be furnished to prove the success of this procedure; and there are those who would frown out of countenance any doubt of the correctness of this seemingly inhuman practice. We are led to believe that in exhausting their strength they exhausted all their art and skill. Worn out by unavailing efforts, disappointed in every new theory that the inspiration of the moment suggests and past experience warrants, it is not strange that blind and desperate efforts are at times resorted to to accomplish that which could find no solution in good judgment. From the boy to the man there are examples enough to make a rule, that offended pride of opinion is restless, and failure stimulates to a blind exhibition of effort; and nowhere do we see this exemplified oftener than in difficult labor, except, it may be, in efforts to start a baulky horse.

I have said it is impossible to produce traction in a line with the axis of the superior strait, for, be the shape or curve of the forceps what they may, the force will be in a line from the point of traction to the place of attachment, or the centre of gravity, or centre of resistance. And, inasmuch as the perineum covers the superior strait in a great part, the line of traction must, to avoid injuring that organ, be thrown nearly in the direction of the axis of the inferior strait, and obliquely to the line of descent; and, for the same reason, the obliquity must increase as the head descends. It would not, under ordinary circumstances, be necessary to remind you of this obliquity, but here it is well to remember that about eight parts in thirty of the force used in traction are lost on the opposing surfaces at the start, and increase as the head descends. The force in an oblique direction is to that in a direct line as the diagonal to the base line of a parallelogram, and as the head descends it shortens the perpendicular, lengthens the base, and approximates it and the diagonal, and consequently cross-pressure is more and more nearly established. This being the case, with the head moving unobstructively over a plane, it might make but little difference in practice; but when it is remembered that the head is subject to the direction of the forceps in changing the

direction of traction, and that it may become wedged between the opposite sides of the pelvis in consequence of such change, we must acknowledge that there is something wanting in the construction of the forceps to make it an instrument certain in its conformation with these well-understood physical laws. It may be urged, on empirical principles, that it is not possible for this to make any difference, for that hundreds of labors are expeditiously terminated by the use of the forceps applied in this manner, no one would be presumptuous enough to deny. But I affirm that, even in the most skillful hands, and in the most favorable cases, part of the force so applied, on account of the causes already named, must certainly be spent upon the opposing tissues; and if so, injurious in proportion to its quantity. And that the forceps are always handled with the greatest possible amount of skill, is hardly to be supposed, when we take into consideration the actual facts in practice and the extent of their use at the present time. We need not search far for proof that the fascination of operative procedure and the stimulus of professional rivalry have thrown down the bars of caution, and opened a free field of competition to any who are bold enough to enter it. The difficulties and dangers which once were said to have surrounded instrumental interference have resolved themselves into questions of small moment, and in the hush of the night, and in the dark and secret chambers of a woman's body, the problem of health and disease, of life and death, is solved without hesitation, even by tyros in the profession. But the use of the forceps presupposes some disproportion between the head and pelvis, naturally produced or consequent upon position. In such cases the demand for every advantage becomes the more imperative. In parts in close contact, moving over each other with great friction, even in a direct line, and held to a certain position by counter-pressure, any force out of a direct line has a tendency to increase the diameter in the proportion of the base to the hypothenuse, and to force a relatively large substance through a small opening, which is impossible; hence the parts become locked, the force applied is not available, and if persistent, contusions or a solution of continuity must follow.

Suppose the head still engaged at the superior strait, three inches and a half in the

bi-parietal diameter, and caught in the sacro-pubic diameter, three inches across, and the forceps properly applied. Now, suppose the head can be moulded and compressed to a size corresponding to that of the diameter of the pelvis. Is it not evident that any obliquity of the head from the axis of the superior strait must lengthen the diameter of the head, and consequently jam it between the promontory of the sacrum and pubis? I have said, when properly applied; and although, when practicable, and consonant with sound principles, it is desirable to apply them to the sides of the head, still the absolute rule of thus applying them partakes somewhat of the dogmatism of fashion, and although having, at first sight, the appearance of correct principles to sustain it, it is, nevertheless, subject to such great inconveniences in practice, and is so much opposed to our appreciation of the situation and direction of the head in the pelvis, that it would seem impossible to do so in transverse positions without doing violence to the perineum or giving an anterior obliquity to the head. If you cannot push the handles of the forceps far enough back toward the sacrum to bring the sides of the blades in a line coincident, or, at least, parallel, to the axis of the superior strait, you cannot apply them to the sides of the head, with it resting in its natural and easiest position for passing through the strait; and if there be a natural obliquity of the head toward the sacrum, as maintained by Nægelé, the difficulty would be increased. Be his doctrine admitted or not, as regards natural labors, we all know that, in brims contracted antero-posteriorly, the inclination of the brim is increased and fixed to a greater or lesser degree; and as it is in such cases that we are the most frequently called upon to apply the forceps at the superior strait, we must expect to meet a direction of the head coinciding with a line perpendicular to the increased inclination, which will increase the difficulty in applying the forceps to the side of the head. And if you force the head to the direction of the handles, you will increase the diameter of the engaging part in proportion to the inclination forward; and if it be great you will hook, if I may use the expression, the boss of the parietal bone over the promontory of the sacrum, and increase, rather than lessen, the difficulty by a faithful adherence to the rule.

It would seem that any reference to artificially produced obliquities of the head, in the

short diameters of the pelvis, if we may judge from their silence upon the subject by distinguished writers and practitioners, is unworthy of notice; and to mention it is but to call to mind a schoolboy's problem. Still, in the face of its simplicity, it is well to bear it in mind. From what has been said, I think it must be apparent that traction cannot be made to advantage with the forceps so applied and the head so placed. I have purposely avoided appealing to authorities, but I cannot refrain from referring to what Dr. Barnes says of the promontory of the sacrum. He says: "The promontory possesses a like importance at the time of entry of the pelvis to that which the symphysis pubis possesses at the outlet. The promontory is a turning point, a centre of revolution, just like the symphysis. The curve round the pubis, which Carus described, has its counterpart in a curve around the promontory. In ordinary labor, with a well-constructed pelvis, the head enters the pelvis, and reaches the floor without deviating much from the straight line which represents the axis of the brim. Thus, it enters its orbit, the circle of Carus, at once. But a projecting promontory, involving as it does commonly a scooped-out sacrum below, disturbs this course. The promontory must be doubled. I propose to call this the curve of the false promontory." Here, as Dr. Barnes says, the promontory becomes the turning point, and well may we ask which way will the head turn? Which way can it turn? Most assuredly not to the front; it must turn backward; then how is it possible to favor its doing so with the forceps, and more especially with the forceps applied to the sides of the head? We want something by the means of which we can roll it into the hollow of the sacrum, and of a certainty we cannot do it by pulling forward.

By keeping the head well flexed, and in its descent correctly in a line with the axis of the brim until it presses upon the floor of the pelvis, we insure rotation, not only in the first and second positions, but also in the fourth and fifth, but cause the nape of the neck to become the centre of extension, making the radius bounded by the distended perineum shorter; we therefore lessen the risk of rupture of that organ, and the chances of the consequent dangers attendant upon such an accident. With the forceps as constructed you cannot do this satisfactorily. The head will extend as it de-

scends, being held to the motions of the forceps; the perineum being in the way, instinctively and correctly, for the safety of the perineum, we must and will shun it in our efforts to extract the head, but by so doing we elevate the handles, make them the long arm of a lever, and depress the blades; the short arm, the fulcrum, being above, the forehead is carried down; thus incautiously we bring the long diameter of the head into play as a means of rupture, whereas, if we could bring the neck to the arch of the pubis before extension takes place, we would have the advantage of a smaller sweep of the head, and consequently would avoid excessive distention of the perineum; and the occiput, being kept lower in the pelvis than the forehead, will strike the inclined plane of the floor of the pelvis, and deflect even from its posterior position to the front, and thus the head, being free, will swing clear of the spine of the ischium, and seek the same place as it holds in the anterior position, and rotation is completed in the usual manner.

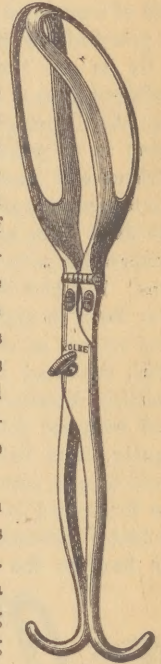
Such being the state of the art in regard to the use and capability of the forceps, and its uncertainty as a means of relief in cases of extreme peril of women in labor, on account of malformation, disease, or accident, and such being the evils in practice growing out of a want of appreciation of its powers and faults, it is not strange that obstetricians should differ as to a choice of means when it is one of them; and it is not strange that they should differ in the use of the instrument, when the instrument, use it as you will, cannot fulfill all the indications of labor. Baudelocque, speaking of labor, says, "The facility of its execution always depends on the union of many causes, and the failure of any one of them may render it difficult, often dangerous, to both mother and child, and even impossible without assistance." A failure in flexion or extension, failure in rotation or any other proper motion of the head, failure in the proper application of power on account of obliquity, and a failure on account of a proper relation of the head and pelvis, play such important parts in delivery, that we must say the forceps, by interfering with all these, often rather impedes than expedites it, and, in spite of the aphorism, there must be efficiency in the instrument as well as skill in the hand that uses it.

In order to obviate the difficulty of fixing the head, and to leave it free to accommodate itself,

as in version and natural labor, and to enable the operator to make traction in the direction of the axis of the superior strait, I propose and have had a pair of forceps made by Mr. Kolbe, which I offer to the profession.

It differs from forceps heretofore used in nothing further than having the fenestrated blades jointed to the shanks at such an angle as will allow the blades to swing in the same line when they are applied to the head. It is so constructed as to allow of the locking of the joints to facilitate the application and correction of the position of the blades. From what has already been said as to the defects of the forceps as heretofore used, I am persuaded that the change in the construction will of itself suggest the principle contemplated.

The forceps being applied in the usual manner, the joint is freed by sliding back the catch. The head becomes at once a link in a chain, commencing with the handles and ending with the distal end of the child, and every link is free to move from any obstruction in the passage, and thereby is enabled to accommodate itself to any open space in the canal; and by making the handles a lever of the third kind, we are enabled to apply force in a direct line and coincident with the axis of any of the planes. For instance, applied to the head at the superior strait, by holding the extremities of the handles in the left hand, pressed together in the usual manner, and with such force as is sufficient to hold them, and making the fulcrum at that point, we apply the force with the other hand, as near as possible to the vulva. We thereby cause the head to flex and descend in a direction controlled by the configuration of the pelvic canal. We do not control the motions of the head, and when it reaches the floor of the pelvis, we change the force to one of direct traction after rotation is completed, and around the sub-public ligaments, if necessary; and by paying the least attention to the relation of the handles to the blades, we have the joint as an index to correct any departure from a correct



line. The head being free, any departure likely to take place would be attended by no bad consequences, because the resolution of forces is such that any aberration would be corrected to at least a mean between the resistance of the perineum and the error in the line of traction, which would reduce the error to practically nothing.

By its use I am convinced you can exert sufficient force to extract the child's head, unless the disproportion between the parts is so great as to preclude success, and that, too, without any unnecessary waste of power on the tissues or organs of the mother or head of the child. The head is as free from dangerous compression as in the use of the ordinary forceps. The lock in the joints preserves control over them in application, and leaves them in that respect as other instruments. Being applied, the head is not turned from the least resisting direction, or forced into violent contact with the pelvis; striking any part obliquely, it is free to deflect and accommodate itself to any curve or plane, consequently all the force used is spent to overcome the unavoidable resistance of the parts and moulding the head to the capacity of the canal. It

would take too much time to point out all the circumstances in which it would be preferable to others. If appreciated, it will suggest its proper use, and familiarity with it will develop new advantages.

I have also had a pair of straight forceps made, by Mr. Gemrig, on the same principle, so that, when the occiput is at the sacro-iliac symphysis, it can be applied in such a manner that, in rotating forward, the handles can rotate with the head and still preserve an angular relation to the pelvis.

Sir, I would end here; but since writing the

above, and on the 29th of October, my friend, Dr. Louis K. Baldwin, called my attention to an article in the *Medical Record*, dated New York, October 27th, 1877, wherein Professor Fordyce Barker is represented as presenting to the New York Academy of Medicine a new forceps devised by M. Tarnier, of France; and although, from what I can gather from the description given of it as made by Dr. Barker, there is no similarity between the instruments, either in the mode of application, of traction, or in the mechanical construction, I owe it to you and myself to refer to it; and I may be permitted to quote from myself to show that as late as two years ago the faults of the forceps were impressed upon my mind, and that my opinions were urged upon others. In an article read before the Sydenham Medical Coterie, of which Drs. Welch, Webb, Holt, Evans, and Baldwin, of this Society, are members, entitled "Modern Obstetrics," I enumerated the same facts and principles as operating against the use of the forceps as I have attempted to present to you to-night. Without going into details, I will only say, I stated, as fundamental facts, in my paper, that the force in extraction acting alone, equals the force of expulsion plus the increased resistance incident to artificially produced positions. That increased resistance endangers the tissues of the mother in proportion to the force required to overcome it. That, it being impossible to ascertain the amount of resistance beforehand, every case of extraction must be, in a certain sense, an experiment. That the fixed position of the child's head in extraction, necessarily making resistance greater, as a natural consequence, does more injury to the tissues of the mother than expulsion."

I will detain you no longer, and will only thank you, sir, and you, gentlemen, for your kind attention to what I have said. I can scarcely hope that all I have said will meet your approval. I did not expect it; but as I have often felt the lack of something in the forceps, and had my doubts as to the correctness of the principle upon which it acted, and have been more confused than enlightened by the statements of others, I attempted to find a path out of the wilderness of discrepancies for myself. How far I have succeeded I will leave the future to determine.

